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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. 10/786,258 | Applicant(s) YANG ET AL. | |
|---|---|---|---|
| | Examiner Curtis B. Odom | Art Unit 2611 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *11 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-8 and 10-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 10-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Arguments*

1. Applicant's arguments filed 10/11/2007 have been fully considered but they are not persuasive. Applicant states (see page 25 of the Remarks) "**The present invention may examine and accumulate channel energies over more than one training sequence by accumulating the channel energies associated with each modulation format over a series of RF bursts within a data frame. Thus, the present invention is able to examine the overall accumulated energy for a series of training sequences contained within a series of RF bursts within a data frame to determine the modulation format associated with the series of RF bursts within the data frame. Sundaralingam (WO 03/0325963 A1) determines the modulation format associated with individual RF bursts and fails to teach or suggest that a series of RF bursts can be examined in order to determine the most likely modulation format associated with the series or that the entire data frame be processed in that matter. In fact Sahlin (US 2004/0156448) specifically teaches that the bursts may only be processed based on the quality measures of the current and prior bursts. (See paragraph 74) The present invention allows the bursts to be processed on the entire data frame. Sahlin, only allows this for the final burst.**

**Applicant respectfully submits that there is no motivation, teaching or suggestion to combine Sundaralingam with Sahlin. Therefore, the rejection on a combination of these references is inappropriate.**"

The Applicant further states (see page 28 of the Remarks) "**Sundaralingam and Sahlin, for the reasons stated above, fail to teach that the accumulation of such results over a number of training sequences (i.e. RF bursts) may be used to determine the modulation format of the received RF bursts. Applicant, therefore, respectfully requests the Examiner to reconsider and withdraw the rejection to allow Claim 1-5, 8-10, 13-15, 18-22, 25-28, 31-34, and 37.**"

**"Applicant respectfully submits that there is no motivation, teaching or suggestion to combine Sundaralingam with Khullar. Therefore, the rejection on a combination of these references is inappropriate. Withdrawal of the rejection allowance of Claims 6, 7, 11, 12, 16, 17, 23, 24, 29, 30, 35 and 36 respectfully requested."**

**"Applicant further submits that neither Sundaralingam or Khullar alone nor the combination of the two teaches or suggests make obvious the invention recited in Claims 6, 7, 11, 12, 16, 17, 23, 24, 29, 30, 35 and 36 because the cited references do not teach that subsequent RF bursts (i.e. training sequences) within a data frame are received and processed to determine accumulated channel energies or error results."**

The Examiner agrees that Sundaralingam (WO 03/0325963 A1) does not teach examining a series of RF bursts in order to determine the most likely modulation format associated with the series. The Examiner also agrees that Sundaralingam and Khullar (U. S. Patent No. 6, 400, 928) do not teach that subsequent RF burst within a data frame are received and processed to determine accumulated channel energies or error results. However, Sahlin et al. (US 2004/0156448) has been cited and combined with the above references and discloses the above limitations. Sahlin et al. discloses a method of detecting a modulation format (8PSK or

GMSK) which involves generating quality measures (channel energies) to detect the modulation format (sections 0041-0044). Sahlin et al. further discloses perfoming quality measurements on training signals (section 0047). Sahlin et al. also discloses the quality measurements are performed for all subsequent bursts in a received block (section 0075) to determine a total (accumulated) quality measurement for detection of the modulation format (section 0075). Thus, based on the disclosure of Sahlin et al., it is the understanding of the Examiner that Sahlin et al. does in fact disclose examining a series of RF bursts by averaging in order to determine the most likely modulation format associated with the series and that subsequent RF burst within a data frame are received and processed to determine accumulated channel energies or error results. Thus as shown in the rejection below, Sundaralingam in combination with Sahlin et al. and Khullar discloses the limitations of the recited claims.

Furthermore, it would have been obvious to one skilled in the art at the time the invention to combine the references of Sundaralingam and Sahlin et al. since Sahlin states that averaging (accumulating) the quality measures (channel energies) over multiple bursts increases the reliability of the detection (identification) of a modulation format (see section 0074). Thus, it is the understanding of the Examiner that there is motivation to combine the above references.

It would have also been obvious to one skilled in the art at the time the invention to combine the references of Sundaralingam and Sahlin et al. since Sahlin states that averaging (accumulating) the quality measures (channel energies) over multiple bursts increases the reliability of the detection (identification) of a modulation format (see section 0074). It would have also been obvious to combine the teachings of Sundaralingam and Sahlin et al. with the teachings of Khullar in order ensure that information received from unreliable bursts (bursts

which compare unfavorably to the identified modulation format of prior RF bursts) does not have an adverse effect on the subsequent signal processing as stated by Khuller et al., column 9, lines 42-57. Thus, based on the above disclosure, it is the understanding of the Examiner that there is motivation to combine the above references.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-4, 8, 10, 13-15, 18-22, 25-28, 31-34, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sundaralingam (previously cited in Office Action 8/8/2005), hereinafter referred to as Reference A in view of Sahlin et al. (previously cited in Office Action 10/5/2006).

Regarding claim 1, Reference A discloses a method (Fig. 2, page 2, line 17-page 3, line 20) to identify a modulation format (8psk or GMSK) of a data frame received from a servicing base station by a mobile station in a cellular wireless communication system, the method comprises:

receiving (Fig. 2, page 2, line 17-page 3, line 20 and page 10, lines 16-20) a first Radio Frequency (RF) burst of the data frame from the servicing base station, wherein the first RF burst carries a plurality of modulated symbols;

extracting (page 8, line 5-page 9, line 6 and column 10, lines 13-20) a training sequence from the first RF burst using a channel estimator, wherein the training sequence comprises modulated symbols;

processing (Fig. 2, blocks 14, 16, 18, and 20, page 8, line 5-page 9, line 6 and column 10, lines 13-20) the training sequence assuming a first modulation format (GMSK modulation and correlation) to produce a first channel energy (page 3, lines 1-20);

processing (Fig. 2, blocks 24, 16, 18, and 20, page 8, line 5-page 9, line 6 and column 10, lines 13-20) the training sequence assuming a second modulation format (8PSK modulation and correlation) to produce a second channel energy (page 3, lines 1-20);

determining (Fig. 2, block 22, page 3, lines 1-20) a greater channel (impulse response) energy from the first channel energy and the second channel energy; and

identifying (Fig. 2, block 22, page 3, lines 1-20) the modulation format (8psk or GMSK) of the first RF burst as corresponding to the greater channel (impulse response) energy.

Reference A does not disclose receiving a subsequent RF burst within the data frame from the servicing base station, wherein the subsequent RF burst carries a plurality of modulated symbols;

processing the training sequence assuming the first modulation format to produce a subsequent first channel energy (page 3, lines 1-20);

accumulating the subsequent first channel energy with the first channel energy to produce an accumulated first channel energy (accumulated tap energies);

processing the training sequence assuming the second modulation format to produce a subsequent second channel energy (column 3, lines 1-20);

accumulating the subsequent second channel energy with the second channel energy to produce an accumulated second channel energy;

determining a greater accumulated channel energy from the first accumulated channel energy and the second accumulated channel energy; and

identifying the modulation format of the subsequent RF burst as corresponding to the greater accumulated channel energy.

However, Sahlin et al. discloses a method of detecting a modulation format (8PSK or GMSK) which involves generating quality measures (channel energies) to detect the modulation format (sections 0041-0044). Sahlin et al. further discloses perfoming quality measurements on training signals (section 0047). Sahlin et al. also discloses the quality measurements are performed for all subsequent bursts in a received block (section 0075) to determine a total (accumulated) quality measurement for detection of the modulation format (section 0075). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to perform the identification procedure as disclosed by Reference A for multiple or subsequent bursts as taught by Sahlin et al. since Sahlin states that averaging (accumulating) the quality measures (channel energies) over multiple bursts increases the reliability of the detection (identification) (see section 0074).

Regarding claim 2, which inherits the limitations of claim 1, Reference A discloses processing the training sequence assuming the first modulation format to produce the first channel energy further comprises derotating the symbols within the training sequence; and

processing the training sequence assuming the second modulation format to produce the second channel energy further comprises derotating the symbols within the training sequence (Fig. 2, blocks 14 and 24, page 10, lines 13-20), wherein the signals are derotated by the rotation angle.

Regarding claim 3, which inherits the limitations of claim 2, Reference A discloses the first modulation format is GMSK; and the second modulation format is 8PSK (Fig. 2).

Regarding claim 4, which inherits the limitations of claim 1, Reference A discloses extracting further comprises: processing the first RF burst to produce a baseband signal; and extracting the training sequence from the baseband signal (page 8, lines 5-page 9, line 6), wherein the demodulation produces a baseband signal and the training sequence is extracted and stored to perform correlation to produce the channel impulse response.

Regarding claim 8, Reference A discloses a method to identify a modulation format of a data frame transmitted between a servicing base station and a wireless terminal in a cellular wireless communication system, the method comprises:

receiving (Fig. 5 and 6, page 8, line 5-page 9, line 6, and page 10, lines 16-20) a first Radio Frequency (RF) burst of the data frame from the servicing base station, wherein the first RF burst carries a plurality of modulated symbols;

extracting (Fig. 5, block 58, page 8, line 5-page 9, line 6) a training sequence from the first RF burst, wherein the training sequence comprises modulated symbols;

producing (Fig. 5, block 60, page 8, line 5-page 9, line 6) a first channel estimate based on the training sequence assuming a first modulation format (GMSK);

applying (Fig. 6, block 68, page 10, line 12-page 11, line 11) the first channel estimate to a reference training sequence of the first modulation format to produce a first reconstructed training sequence (ref);

comparing the (Fig. 6, blocks 70, 72, and 74, page 10, line 12-page 11, line 4 and page 12, lines 4-14)) training sequence to the first reconstructed training sequence to produce a first error magnitude result (noise variance);

producing (Fig. 5, block 60, page 8, line 5-page 9, line 6) a second channel estimate based on the training sequence assuming a second modulation format (8PSK);

applying (Fig. 6, block 68, page 10, line 12-page 11, line 11) the second channel estimate to a reference training sequence of the second modulation format to produce a second reconstructed training sequence;

comparing (Fig. 6, block 70, page 10, line 12-page 11, line 4 and page 12, lines 4-14) the training sequence to the second reconstructed training sequence to produce a second error magnitude result (noise variance); and

identifying the modulation format of the first RF burst as the one corresponding to the smaller error magnitude (Fig. 5, block 86, page 12, lines 18-22).

Reference A does not discloses receiving a subsequent RF burst data frame from the servicing base station, wherein the subsequent RF burst carries a plurality of modulated symbols;

processing the training sequence assuming the first modulation format to produce a subsequent first error magnitude;

accumulating the subsequent first error magnitude with the first error magnitude to produce an accumulated first error magnitude;

processing the training sequence assuming the second modulation format to produce a subsequent second error magnitude;

accumulating the subsequent second error magnitude with the second channel energy to produce an accumulated second error magnitude;

determining a smaller accumulated error magnitude from the first accumulated error magnitude and the second accumulated error magnitude; and

identifying the modulation format of the subsequent RF burst as corresponding to the smaller accumulated error magnitude.

However, Sahlin et al. discloses a method of detecting a modulation format (8PSK or GMSK) which involves generating quality measures such as signal-to-noise ratios (which respresent an error magnitude) to detect the modulation format (sections 0041-0044). Sahlin et al. further discloses perfoming quality measurements on training signals (section 0047). Sahlin et al. also discloses the quality measurements are performed for all subsequent bursts in a received block (section 0075) to determine a total (accumulated) quality measurement for detection of the modulation format (section 0075). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to perform the identification procedure as disclosed by Reference A for multiple or subsequent bursts as taught by Sahlin et al. since Sahlin states that averaging (accumulating) the quality measures over multiple bursts increases the reliability of the detection (identification) (see section 0074).

Regarding claim 10, which inherits the limitations of claim 9, Reference A further discloses the first modulation format is GMSK; and the second modulation format is 8PSK (Fig. 5).

Regarding claims 13-15, Reference A further discloses the limitations of claims 13-15 (see claims 1-3), including the method of claims 13-15 (see claims 1-3) performed in a wireless terminal (Fig. 1, block 8 and Fig. 9, page 1, line 11-page 2, line16) that comprises an RF front end (Fig. 8, blocks 100, and 102); a baseband processor communicatively coupled to the RF front end (Fig. 8, blocks 104, 106, and 108); and a CODEC processing module communicatively coupled to the baseband processor (Fig. 8, block 110, page 2, lines 2-16), wherein the receiver is a GPRS receiver which allows coding/decoding as described herein.

Regarding claim 18, which inherits the limitations of claim 13, Reference A further discloses the wireless terminal operates according to GSM standard (page 1, line 11-page 2, line16 and page 8, lines 5-15).

Regarding claims 19-22, Reference A further discloses the limitations of claims 19-22 (see claims 1-4), including the method of claims 19-22 (see claims 1-4) performed in a wireless terminal (Fig. 1, block 8 and Fig. 9, page 1, line 11-page 2, line16) that comprises an RF front end (Fig. 8, blocks 100, and 102); a baseband processor communicatively coupled to the RF front end (Fig. 8, blocks 104, 106, and 108).

Regarding claim 25, which inherits the limitations of claim 19, Reference A further discloses the wireless terminal operates according to GSM standard (page 1, line 11-page 2, line16 and page 8, lines 5-15).

Regarding claims 26-28, Reference A further discloses the limitations of claims 26-28 (see claims 8 and 10), including processing the first RF burst to produce a baseband signal; and extract the training sequence from the baseband signal (page 8, lines 5-page 9, line 6) wherein the method of claims 26-28 are performed in a wireless terminal (Fig. 1, block 8 and Fig. 9, page

1, line 11-page 2, line16) that comprises an RF front end (Fig. 8, blocks 100, and 102); a baseband processor communicatively coupled to the RF front end (Fig. 8, blocks 104, 106, and 108); and a CODEC processing module communicatively coupled to the baseband processor (Fig. 8, block 110, page 2, lines 2-16), wherein the receiver is a GPRS receiver which allows coding/decoding as described herein.

Regarding claim 31, which inherits the limitations of claim 26, Reference A further discloses the wireless terminal operates according to GSM standard (page 1, line 11-page 2, line16 and page 8, lines 5-15).

Regarding claims 32-34, Reference A further discloses the limitations of claims 32-34 (see claims 8 and 10), including processing the first RF burst to produce a baseband signal; and extract the training sequence from the baseband signal (page 8, lines 5-page 9, line 6) wherein the method of claims 32-34 are performed in a wireless terminal (Fig. 1, block 8 and Fig. 9, page 1, line 11-page 2, line16) that comprises an RF front end (Fig. 8, blocks 100, and 102); and a baseband processor communicatively coupled to the RF front end (Fig. 8, blocks 104, 106, and 108).

Regarding claim 37, which inherits the limitations of claim 32, Reference A further discloses the wireless terminal operates according to GSM standard (page 1, line 11-page 2, line 16 and page 8, lines 5-15).

4. Claims 5-7, 11, 12, 16, 17, 23, 24, 29, 30, 35, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sundaralingam (previously cited in Office Action 8/8/2005), hereinafter referred to as Reference A in view of of Sahlin et al. (previously cited in Office

Action 10/5/2006) as applied to claims 1-4, 8, 10, 13-15, 18-22, 25-28, 31-34, and 37, and in further view of Khullar et al. (previously cited in Office Action 8/8/2005).

Regarding claims 5-7, 11, 12, 16, 17, 23, 24, 29, 30, 35, and 36, Reference A and Sahlin et al. disclose all the limitations of claims 6, 7, 11, 12, 16, 17, 23, 24, 29, 30, 35, and 36 (see above rejection of claims 1-4, 8-10, 13-15, 18-22, 25-28, 31-34, and 37) except comparing the identified modulation format of the subsequent RF burst to the identified modulation format of previous RF bursts of the data frame; demodulating the subsequent RF burst according to the identified modulation format of the subsequent RF burst; and discarding the prior RF bursts of the data frame when the identified modulation format of the subsequent RF burst compares unfavorably to the identified modulation format of prior RF bursts or reprocessing the prior RF bursts of the data frame according to the identified modulation format of the subsequent RF burst when the identified modulation format of the subsequent RF burst (of previous data frames) compares unfavorably to the identified modulation format of the prior RF burst.

Khullar et al. discloses a very similar method/apparatus for receiving RF burst and for determining a modulation scheme (GMSK or 8PSK) which includes generating channel energies (through channel estimation) and comparing the energies (highest energy to detect the modulation scheme (Fig. 4, column 8, lines 24-67). Khullar et al. also discloses comparing the identified modulation format of the subsequent RF burst to the identified modulation format of previous RF bursts of the data frame (column 9, lines 17-30); demodulating the subsequent RF burst according to the identified modulation format of the subsequent RF burst (column 9, lines 1-17); and discarding (setting soft values to zero) the prior RF bursts of the data frame when the identified modulation format of the subsequent RF burst compares unfavorably to the identified

modulation format of prior RF bursts (column 9, lines 42-57) or reprocessing (converting) the prior RF bursts of the data frame according to the identified modulation format of the subsequent RF burst when the identified modulation format of the subsequent RF burst compares unfavorably to the identified modulation format of the prior RF burst (column 9, lines 17-30). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the method/apparatus of Reference A and Sahlin et al. with the teachings of Khullar et al. in order ensure that information received from unreliable bursts (bursts which compare unfavorably to the identified modulation format of prior RF bursts) does not have an adverse effect on the subsequent signal processing (Khuller et al., column 9, lines 42-57).

### *Conclusion*

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 571-272-3046. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Curtis Odom
October 28, 2007